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EFFLUENT LIMITATIONS GUIDELINES AND STANDARDS OF PERFORMANCE AND PRETREATMENT STANDARDS FOR ELECTROPLATING POINT SOURCE CATEGORY

Proposed Rules

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 413]

EFFLUENT LIMITATIONS GUIDELINES AND STANDARDS OF PERFORMANCE AND PRETREATMENT STANDARDS FOR ELECTROPLATING POINT SOURCE CATEGORY

Notice of Proposed Rulemaking

Notice is hereby given that effluent limitations guidelines for existing sources and standards of performance and pretreatment standards for new sources set forth in tentative form below are proposed by the Environmental Protection Agency (EPA) for the electroplating of copper, nickel, chromium and zinc on ferrous, non ferrous and plastic materials subcategory of the electroplating category of point sources pursuant to sections 304(b), 306(b) and 307(c) of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251, 1314 and 1316, 1316(b) and 1317(c), 86 Stat. 816 et seq.) (the Act).

(a) Legal authority.

(1) Existing point sources.

Section 301(b) of the Act requires the achievement by not later than July 1, 1977, of effluent limitations for point sources, other than publicly owned treatment works, which require the application of the best practicable control technology currently available as defined by the Administrator pursuant to section 304(b) of the Act. Section 301(b) also requires the achievement by not later than July 1, 1983, of effluent limitations for point sources, other than publicly owned treatment works, which require the application of best available technology economically achievable which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants, as determined in accordance with regulations issued by the Administrator pursuant to section 304(b) to the Act. Section 304(b) of the Act requires the Administrator to publish, within one year of enactment of the Act, regulations providing guidelines for effluent limitations setting forth the degree of effluent reduction attainable through the application of the best practicable control technology currently available and the degree of effluent reduction attainable through the application of the best control measures and practices achievable including treatment, techniques, process and procedure innovations, operating methods and other alternatives.

(2) New sources

Section 306 of the Act requires the achievement by new sources of a Federal standard of performance providing for the control of the discharge of pollutants which reflects the greatest degree of effluent reduction which the Administrator determines to be achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants.

Section 306(b)(1)(A) of the Act requires the Administrator to publish a list of categories of sources within 90 days after the date of enactment of the Act (October 18, 1972). Within one year after a category of sources is included on the list, the Administrator is required to propose regulations establishing Federal standards of performance for new sources within such category. The Administrator published in the FEDERAL REGISTER of January 16, 1973 (38 FR 1624) a list of 27 source categories. The electroplating source category was included on the list. The regulations proposed herein set forth the standards of performance applicable to new sources within the electroplating of copper, nickel, chromium and zinc on ferrous, nonferrous and plastic materials subcategory of the electroplating source category.

Section 307(c) of the Act requires the Administrator to promulgate pretreatment standards for new sources at the same time that standards of performance for new sources are promulgated pursuant to section 306. Section 413.15 proposed below provides pretreatment standards for new sources within the electroplating of copper, nickel, chromium and zinc on ferrous, nonferrous and plastic materials subcategory of the electroplating source category.

Section 304(c) of the Act requires the Administrator to issue to the States and appropriate water pollution control agencies information on the processes, procedures or operating methods which result in the elimination or reduction of the discharge of pollutants to implement standards of performance under section 306 of the Act. The report referred to below provides, pursuant to section 304(c) of the Act, preliminary information on such processes, procedures or operating methods.

(b) Summary and basis of proposed effluent limitations guidelines, standards of performance and pretreatment standards for new sources.

(1) General methodology.

The effluent limitations guidelines and standards of performance proposed herein were developed in the following manner. The point source category was first studied for the purpose of determining whether separate limitations and standards are appropriate for different segments within the category. This analysis included a determination of whether differences in raw material used, product produced, manufacturing process employed, age, size, waste water constituents and other factors require development of separate limitations and standards for different segments of the point source category. The raw waste characteristics for each such segment were then identified. This included an analysis of: (1) Source, flow and volume of water used in the process employed and the sources of waste and waste waters in the operation; and (2) the constituents (including thermal) of all waste water. The constituents of the waste waters which should be subject to effluent limitations and guidelines standards of performance were identified.

The full range of control and treatment technologies existing within each segment was identified. This included an identification of each distinct control technology, including both inplant and end-of-process technologies which are existent or capable of being designed for each segment. Also included was an identification, in terms of the amount of constituents (including thermal) and the chemical, physical, biological characteristics of pollutants, of the effluent level resulting from the application of each of the treatment and control technologies. The problems, limitations, and reliability of each treatment and control technology and the required implementation time was also identified. In addition, the nonwater quality environmental impact, such as the effects of the application of such technologies upon other pollution problems, including air, solid waste, noise and radiation were also identified. The energy requirements of each control and treatment technology identified as well as the cost of the application of such technologies were identified.

The information, as outlined above, was then evaluated in order to determine what levels of technology constitute the "best practicable control technology currently available," "best available technology economically achievable" and the "best available demonstrated control technology, processes, operating methods, or other alternatives." In identifying such technologies, various factors were considered. These included the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application, the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, nonwater quality environmental impact (including energy requirements) and other factors.

The data on which the above analysis was performed was derived from consultant reports, site inspections, published and unpublished technical literature, State pollution control agencies and industry submissions.

The pretreatment standards proposed herein are intended to be complementary to the pretreatment standards proposed for existing sources under Part 128 of 40 CFR. The basis for such standards is set forth in the FEDERAL REGISTER of July 19, 1973, 38 FR 19236. The provisions of Part 128 are equally applicable to sources which would constitute "new sources," under section 306 if they were to discharge pollutants directly to navigable waters, except for section 128.133. That section provides a pretreatment standard for "incompatible pollutants" which requires the application of the "best practicable control technology currently available," subject to an adjustment for amounts of pollutants removed by the publicly owned treatment works. Since the pretreatment standards proposed herein apply to new sources, section 413.15 below amends section 128.133 to require application of the standard of performance for new sources rather than the "best practicable" standard applicable to existing sources under sections 301 and 304(b) of the Act.

(2) Summary of conclusions with respect to electroplating of copper, nickel, chromium and zinc on ferrous, nonferrous and plastic materials subcategory.

Electroplating is the electrodeposition of an adherent coating upon an electrode for the purpose of securing a surface with properties or dimensions different from those of the basis material. The primary reasons for applying the plated coatings are (i) to produce and retain a desired surface appearance, for example, color or luster; (ii) to protect the basis material against corrosion; (iii) to protect the basis material against some specific chemical reaction; (iv) to protect the basis material against wear caused by either abrasion or erosion; or (v) to increase the dimensions of the basis material.

An electroplating process consists of a series of operations which include (1) preparation for plating, (2) plating, and (3) postplating treatments. Preparation for plating normally consists of alkaline cleaning and acid dipping to remove dirt and scale prior to plating. Rinsing in a separate tank or tanks follows both alkaline cleaning and acid dipping. The plating step consists of one or more operations in which the workpiece is immersed in a solution, and acquires an electrodeposited coating of one or more metals. Rinsing follows each plating operation. Postplating treatments are common for zinc-plated steel and copper-plated products and consist primarily of bright dipping, chromate filming, and coloring. Rinsing also follows each postplating operation.

The electroplating of copper, nickel, chromium, and zinc on ferrous, nonferrous, and plastic materials is a single subcategory of the electroplating point source category for the purpose of establishing effluent limitations guidelines and standards of performance. The consideration of other factors such as the age and size of the facilities, processes employed, waste water constituents, and waste control technologies further substantiate that copper, nickel, chromium, and zinc electroplating should be considered one subcategory.

The known significant pollutants contained in the waste waters from this subcategory include copper, hexavalent chromium, total chromium, oxidizable cyanide, total cyanide, nickel, zinc, pH, and suspended solids. While other pollutants, such as iron, sometimes may be present in the waste waters from this subcategory, effluent limitations were not developed for these constituents because (i) they are discharged intermittently and in small quantities; (ii) they are effectively removed from the effluent by the application of waste water control and treatment technology required for the removal of waste water constituents which are subject to effluent limitations; and (iii) in almost all cases, there is insufficient data available upon which to base effluent limitations.

Because high quality water is required for effective rinsing of electroplated parts, the electroplating industry has traditionally used large amounts of water and generally has limited water use only to the extent required by the cost of the water utilized. Wastewater control techniques such as process modifications, material substitutions, water conservation, and good housekeeping techniques are available to reduce the quantities of pollutants ultimately discharged from electroplating facilities. Most of these control techniques have been effectively demonstrated and are considered normal practice in the industry.

Process modifications can reduce the quantity of pollutants in the waste waters from electroplating operations. These include (i) elimination of copper plating prior to nickel and chromium plating, especially for plating on steel; (ii) elimination of copper plating by increasing the thickness of nickel; (iii) substitution of a nickel strike for a copper strike and the replacement of the high-rate copper cyanide solution with a copper sulfate bath; and (iv) substitution of low-concentration electroplating solutions for high-concentration solutions.

Material substitutions can also reduce the quantities of pollutants discharged. Such substitutions include (i) replacement of cyanide-copper and cyanide-zinc plating solutions with low-cyanide or cyanide-free plating solutions, and (ii) use of trivalent chromium plating baths to eliminate the presence of hexavalent chromium. In addition to eliminating a potentially toxic pollutant, this material substitution could reduce waste treatment cost by eliminating the need for the reduction of hexavalent chromium.

Water conservation techniques reduce the amount of water used in electroplating processes and also can reduce the amount of pollutants in the effluent following chemical treatment. Some of these include methods to (i) improve racking procedures to facilitate drainage from workpiece surfaces over process tanks; (ii) increase drainage time over the process tanks; (iii) reduce the viscosity of the process solutions by dilution or heating; (iv) add wetting agents to the process solutions to reduce surface tension; (v) install fog nozzles above process tanks to return a portion of the solution remaining on the workpiece to the process solution; (vi) install reclaim tanks between process tanks and rinse tanks to collect dragout for return to the process solution; (vii) install counter flow rinsing tanks whereby the water in the last rinsing tank becomes feedwater for the preceding tank; and (viii) install air or ultrasonic agitation devices in the rinse tanks.

Good housekeeping techniques can reduce the amount of pollutants in the waste waters from electroplating facilities. These include techniques to (i) maintain racks and rack coatings to prevent the transfer of chemicals from one operation to another (loose rack coatings are noteworthy as an example of poor practice); (ii) avoid overcrowding parts on a rack, which inhibits drainage when parts are removed from a process solution; (iii) plug all floor exits to the sewer and contain spills in segregated curbed areas or trenches, which can be drained to direct the spills to rinse water effluent with the same chemicals; (iv) wash all filters, pumps and other auxiliary equipment in curbed areas or trenches, which can be drained to direct the wash water to a compatible holding tank or rinse water stream; (v) install anti-syphon devices on all inlet water lines to process tanks; (vi) inspect and maintain heating and cooling coils to avoid leaks; and (vii) inspect and maintain all piping installed for waste water flow, including piping from fume scrubbers.

Conventional chemical treatment consisting basically of cyanide oxidation, hexavalent chromium reduction, and coprecipitation of heavy metals as hydroxides has been a standard end-of-process waste water treatment technique for the electroplating industry for twenty-five years. Most companies achieving good effluent quality practice some form of chemical treatment in combination with in-plant controls to minimize water use and optimize the precipitation process. Numerous plants employing techniques such as ion exchange, reverse osmosis, evaporative recovery, etc., were investigated but none achieved substantially better effluent quality than those employing good rinsing techniques, practicing good housekeeping, and utilizing well-controlled chemical treatment. The use of concentration techniques such as evaporative recovery was found to be effective in reducing water costs, recovering metal values, and effecting better precipitation. However, chemical treatment remains a requirement for most electroplating processes. The elimination of the discharge of process waste water pollutants can be accomplished by water recovery, by evaporation condensation, or by reverse osmosis in combination with chemical treatment and filtration for acid or alkali waste. Ion exchange is useful for waste water conservation, but is not practical for eliminating waste water constituents at the end of the process. The preferred mode of operation is to conserve all plating bath chemicals and return them to the plating bath, and concentrate all other chemicals (from preplate and postplate operations) for chemical treatment and environmentally acceptable disposal in a solid state. Where solids disposal is a problem, any of the other previously mentioned control techniques should be considered to minimize the production of sludge. Metals recovery is particularly important in this industry because of the relatively high value of the metals components of the sludge and the need to conserve such scarce natural resources. Electroplaters should be aware of their responsibility for proper handling of sludges containing heavy metals. Further technical evaluation is necessary in order to make technical judgments regarding specific practices, and to assess relative cost impacts of the several alternatives.

It is estimated that the total annual cost of chemical treatment would amount to approximately 15 percent of sales for medium to large facilities (24 square

meters plated per hour or more) and approximately 37 percent of sales for very small facilities (24 square meters plated per hour or less). These estimates represent maximum increases and assume that no controls are currently in place. The incremental cost to eliminate the discharge of pollutants by combining chemical treatment with other control and treatment technologies is estimated to be approximately 8 percent of sales for facilities plating more than 54 square meters per hour and from 6 percent to 15 percent for facilities plating less than 54 square meters per hour. The cost of lagooning or landfilling sludges after chemical or other treatment has not been considered in arriving at the above cost estimates. For ecological reasons, an alternative to landfilling should be sought, such as recovery of metal values. Firm data on the relative costs of landfilling on recovery of metals is not yet available. However, current expenditures by industrial waste generators for treatment and disposal of hazardous waste sludges are believed to be low relative to the cost required for adequate treatment and disposal. Small electroplating facilities may be able to offset economic disadvantages by combining wastes for treatment and disposal.

The electric power used for plating consumes about 0.06 percent of the nation's electrical energy (1.7×10^{12} kilowatt hours). The power required for chemical treatment is approximately 3.2 percent of the power needed for plating. Reverse osmosis will eliminate the discharge of pollutants (when combined with chemical treatment) using 27 percent of the power required for electroplating. The nonwater quality environmental impact of the chemical treatment of electroplating wastes consists of increased sludge production resulting from the removal of soluble metals from the waste waters as insoluble hydroxides and the proper disposal of these hydroxides. The nonwater quality environmental impact of achieving zero discharge of pollutants from the electroplating industry involves two principal considerations, energy requirements and sludge production and disposal. The application of waste water concentration techniques, such as evaporation, to recover process chemicals and reuse the condensate for rinsing requires energy for heat exchange and pumping. The solid wastes produced from such operations and from chemical treatment must be controlled to prevent their entry into navigable waters or into subsurface waters.

Solid constituents from the waste water should be disposed of in an acceptable landfill, which means a landfill at which complete long term protection is provided for the quality of surface and subsurface waters, from hazardous substances contained in electroplating wastes deposited therein, and against hazard to public health and the environment. Such sites should be located and engineered to avoid direct hydraulic continuity with surface and subsurface waters, and any leachate or subsurface flow into the disposal area should be contained within the site unless treatment is provided. Where appropriate, the location of the solid hazardous materials disposal site should be permanently recorded in the application office of legal jurisdiction.

The best practicable control technology currently available for this electroplating subcategory of point sources has been determined to be a well-designed and well-operated chemical treatment system to destroy cyanide, precipitate heavy metals, and separate solids from the waste stream prior to discharge. The best practicable control technology currently available includes those in-process controls which are considered normal practice in the industry. The in-process controls available to improve the quality of effluent from electroplating facilities, and which are considered normal practice in the industry, include, but are not limited to, (i) process modifications which include the elimination of a plating operation or substitution of one plating operation for another; (ii) water conservation techniques which include the modification of the number and type of rinsing stations used, e.g. installation of countercurrent rinses and reclaim tanks; (iii) material substitutions to eliminate pollutants from the plating bath and, ultimately, from the effluent, e.g. cyanide free plating baths; and (iv) good housekeeping techniques to contain spills and leaks from plating solutions, to detect pollutants in cooling water streams, and to hold concentrated solutions prior to treatment.

Numerous alternatives are available to the electroplater in addition to those outlined under the four general categories of in-process controls described above. The choice of a particular in-process control strategy depends upon the nature of the specific electroplating facility. Any one or combination of in-process controls in addition to chemical treatment may be required to meet the effluent limitations based upon the best practicable control technology currently available.

The best available technology economically achievable for this subcategory of the electroplating point source category has been determined to be a combination of in-process and end-of-process control and treatment to achieve no discharge of process waste water pollutants. By the use of in-process controls to reduce the volume of waste water, it becomes economical to use end-of-process treatment designed to recover water and reuse the water within the plant, thus avoiding any discharge of effluent to navigable waters. Solid constituents in the waste water are disposed of in an acceptable landfill. One such type of treatment system that has been designed and is currently in operation supplements conventional chemical treatment with the use of reverse osmosis to recover water from the treated waste stream. Additional water is recovered for reuse by evaporation of the concentrated waste stream from the reverse osmosis unit.

New source performance standards to be achieved by new sources within the category are based on the application of the best available demonstrated control technology. The best available demonstrated control technology has been determined to be the extensive use of in-plant controls and process modifications to minimize water use in combination with a well-designed and well-operated chemical treatment system to minimize the discharge of pollutants. The best available demonstrated control technology implies a minimum of double countercurrent rinsing after each process plating tank and on the acid/alkali stream to allow the plater maximum flexibility to incorporate additional treatment and control techniques as they become technically feasible and economically attractive. Such techniques have been demonstrated to various degrees and include ion-exchange, reverse osmosis, evaporative recovery and others. Furthermore, the best available demonstrated control technology includes waste stream segregation, where necessary, to achieve effluent limitations and facilitate the use of advanced treatment techniques as they become available. Each of the control and treatment alternatives discussed previously are applicable to new sources in the electroplating category. The options open to new sources to achieve no discharge of process waste water pollutants are more numerous and varied than those for existing sources because of their flexibility in engineering design.

Some of the pollution control and treatment techniques available for use by new sources include (i) countercurrent rinse tanks to minimize water flow at all rinse stations; (ii) processes eliminating the use of some chemicals requiring treatment, e.g., cyanide; (iii) waste water concentration techniques such as ion-exchange, reverse osmosis, evaporative recovery, etc., at appropriate locations both in-process or end-of-pipe; (iv) complete segregation of waste water streams to optimize chemical treatment efficiency; and (v) specialization in processes which minimize the production of pollutants or which produce pollutants amenable to control and treatment.

As an adjunct to the technical analysis, an economic impact analysis was conducted. This analysis concluded that the proposed guidelines for 1977, 1983 and for new sources are not expected to have any significant effect on the production capacity or future growth of the electroplating industry. It is likely, however, that significant prices increases will result as the cost of the guidelines are passed on to customers. These increases are projected to be a maximum of 15 percent for 1977 with additional increase of about 8 percent for 1983. In addition, due to disproportionate cost increases resulting from 1977 guidelines, a number of low volume job shops may be forced to close. This would be the case especially for an estimated maximum of 380 very small facilities, plating less than 24 square meters per hour. These shops

would represent approximately 760 employees and about 1.7 percent of total capacity for the job shop sector. The projected price increases and the potential closures among small job shops are not expected to have any balance of trade effects.

A draft report entitled "Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the COPPER, NICKEL, CHROMIUM and ZINC Segment of the Electroplating Point Source Category" further describes the analysis undertaken in support of the regulations being proposed herein and is available for inspection in the EPA Information Center, Room 227, West Tower, Waterside Mall, Washington, D.C., at all EPA regional offices, and at State water pollution control offices. A supplementary analysis prepared for EPA of the possible economic effects of the proposed regulations is also available for inspection at these locations. Copies of both of these documents are being sent to persons or institutions affected by the proposed regulations, or who have placed themselves on a mailing list for this purpose (see EPA's Advance Notice of Public Review Procedures, 38 FR 21202, August 6, 1973). An additional limited number of copies of both reports are available. Persons wishing to obtain a copy may write the EPA Information Center, Environmental Protection Agency, Washington, D.C. 20460, Attention: Mr. Philip B. Wisman.

(c) Summary of public participation. Prior to this publication, the agencies and groups listed below were consulted and given an opportunity to participate in the development of the effluent limitations guidelines and standards of performance for the electroplating of copper, nickel, chromium and zinc on ferrous, nonferrous and plastic materials subcategory. The following are the principal agencies and groups consulted: Effluent Standards and Water Quality Information Advisory Committee (established under section 515 of the Act), all State and U.S. Territory Pollution Control Agencies, New England Interstate Water Pollution Control Commission, Ohio River Valley Sanitation Commission, Delaware River Basin Commission, The American Society of Mechanical Engineers, The American Society of Civil Engineers, Hudson River Sloop Restoration, Inc., The Conservation Foundation, Environmental Defense Fund, Inc., Natural Resources Defense Council, Water Pollution Control Federation, National Wildlife Federation, Department of the Interior, Department of Commerce, Water Resources Council, Department of Defense, Atomic Energy Commission, Department of Housing and Urban Development, Department of the Treasury, National Association of Metal Finishers, Metal Finishers Suppliers Association, and the American Electroplaters Society.

The primary issue raised during the development of effluent limitations guidelines and standards of performance concerned the impact of the effluent limitations on the small electroplating job shop. The electroplating industry expressed concern about several aspects of the effluent limitations and the implicit control and treatment technology. The principal issues raised were:

(1) The extent to which the costs of the application of technology to meet effluent limitations had been considered;

(2) The extent to which the technology required to attain the effluent limitations had been demonstrated;

(3) The extent to which the technology might not be employable because of space limitations in the facility; and

(4) The extent to which process variations such as barrel plating and rack plating of complex shapes had been considered.

During the development of effluent limitations guidelines and standards of performance for the electroplating category of sources, the costs of the application of control and treatment technologies to achieve the effluent limitations have been carefully considered. Nevertheless, some electroplaters may experience financial difficulty in attaining effluent limitations based on the best practicable control technology currently available because of individual peculiarities such as size, geographical location or age of the facility. Where these peculiarities become critical, the choices for the plater may become relocation, judicious space utilization, cooperative waste treatment, or specialization. However, the guidelines were developed to allow the maximum flexibility to meet the effluent limitations with a combination in-plant controls and end-of-pipe treatment. Thus the impact on the small job shop should be minimized.

The best practicable control technology currently available for this subcategory of sources was determined to be chemical treatment with such in-plant controls as are necessary to minimize water use. Conventional chemical treatment to destroy cyanide, precipitate heavy metals, and separate solids from the liquid waste stream has been practiced by the industry for many years. The effectiveness of such systems has been adequately demonstrated in industrial electroplating facilities of all sizes and configurations. The major variations of chemical treatment (batch, continuous, and integrated) provide technical and economic flexibility to the plater to fit individual needs. To meet the effluent limitations based on the application of the best practicable control technology currently available, many platers will be required to reduce significantly their present water usage in addition to employing chemical treatment. Numerous adequately demonstrated, inexpensive techniques are available to do so. These in-plant controls (water conservation techniques) range from improved racking procedures to installation of additional countercurrent rinse tanks. Additional details of the in-plant controls normally practiced by this industry appear in the development document referenced in this section.

The installation of any equipment to reduce water pollution or to increase plating capacity requires space. Some platers may have little or no space for the installation of chemical treatment tanks, rinse tanks, or plating tanks. Nevertheless, these platers have several options available to them to reduce the discharge of pollutants without using additional floorspace. Some examples of these include: (1) reduction of dragout by improving process controls such as bath temperature and composition, positioning of work pieces on racks, etc., (2) installation of dole valves, fog rinses, etc., or (3) conversion of existing series rinse tanks to countercurrent. Once water usage is minimized by in-process controls, any of several additional waste water treatment alternatives requiring minimum space may become attractive. Batch or integrated chemical treatment may be feasible with the reduced flow. Tanks of a moderate size may be feasible to hold wastes for periodic removal by a scavenger service or other responsible waste treatment and disposal contractor. As the volume of waste water to be treated is reduced, the option to treat at another location may become attractive. The combined treatment of wastes from several electroplating facilities in the same geographical area all with space limitations may become practical. The use of space above and below existing process lines is common practice in engineering laboratories and the chemicals industries. While it is not possible to offer solutions to every plater's space problems, the number of possible solutions is larger than normally assumed.

The choice of rack or barrel methods for plating is based on the size and quantity of the parts to be processed per unit of time. Neither of these conditions imposes a significant technical change in the operations for electroplating. The selection is always based on economic considerations because hand racking of small parts is usually more costly than dumping them in a barrel for processing in bulk. Technically, any plating operation can be done either by rack or by barrel operations. Sometimes plating bath compositions will be modified by altering the concentration of solution constituents. However, the same types of salts, acids, and additives will be used. Thus, the impact on waste characteristics is not changed. The volume of waste water (dragout) is frequently greater in barrel plating operations but the final effluent quality is not a function of influent concentration. Techniques are available to reduce the rinse water volumes in barrel plating to the levels of rack plating. If the shape of the parts being plated requires the use of in-process controls such as countercurrent rinsing, evaporation, or other advanced recovery systems for achieving reduced water use to counteract the effect of unusually high dragout, any supplemental cost should be reflected in the cost of the plated product. Any such incremental increase in the cost of plating will direct attention to the design of parts that drain more easily to reduce dragout. Techniques are available to reduce the rinse water volumes from the plating of complex shapes to the levels of simple, well-drained shapes.

Several comments were received concerning the production basis of the guidelines. The most appropriate production unit in some industries is either the weight of product produced or the quantity of raw materials used. Neither of these bases is appropriate for the electroplating industry. The weight of products bears no relation to the raw waste produced inasmuch as electroplating is a surface process which is not influenced by the volume or density of the products or the thickness of metal plated. The amount of raw materials used is not an accurate indicator of the waste produced. The consideration of many factors led to the conclusion that the unit of production most appropriate for the electroplating industry is plated area. Although the total surface area withdrawn from a plating solution is the principal factor influencing the dragout of constituents from the plating solution and, ultimately, the amount of pollutants in the waste water, the total surface area is rarely known and may be impractical to measure in the typical electroplating shop. Therefore the plated area, which either is known or is calculable, is the logical alternative unit of production. Alternative units of production based on amperes and water used were developed and correlated with plated area and total surface area during the development of effluent limitations; however, area plated provided the best basis for establishing effluent limitations. The electroplating industry is invited to submit comments on the proposed production basis of the guidelines, and to suggest alternative units of production. The supporting rationale for such suggestions should be included with the comments.

The economic impact studies show a more severe economic impact on very small shops than the rest of the industry on the basis of very limited information. Interested persons are invited to submit comments on any aspect of the proposed guidelines, particularly as they affect the small plater whether he discharges into surface waters or a municipal treatment system. Information on alternative treatment technologies to meet the guidelines and the associated costs are specifically requested. The number, size, and locations of plants affected by the guidelines has been estimated by EPA. Any external estimates by industry are invited. On the basis of the information available, EPA will consider segmentation on the basis of size in the final regulation.

Interested persons may participate in this rulemaking by submitting written comments in triplicate to the EPA Information Center, Environmental Protection Agency, Washington, D.C. 20460. Attention: Mr. Philip B. Wisman. Comments on all aspects of the proposed regulations are solicited. In the event comments are in the nature of criticisms as to the adequacy of data which is available, or which may be relied upon by the Agency, comments should identify and, if possible, provide any additional data which may be available and should indicate why such data is essential to the development of the regulations. In the event comments address the approach taken by the agency in establishing an effluent limitation guideline or standard of performance, EPA solicits suggestions as to what alternative approach should be taken and why and how this alternative better satisfies the detailed requirements of sections 301, 304(b), 306 and 307 of the Act.

A copy of all public comments will be available for inspection and copying at the EPA Information Center, Room 227, West Tower, Waterside Mall, 401 M Street SW., Washington, D.C. A copy of preliminary draft contractor reports, the Development Document and economic study referred to above and certain supplementary materials supporting the study of the industry concerned will also be maintained at this location for public review and copying. The EPA information regulation, 40 CFR Part 2, provides that a reasonable fee may be charged for copying.

All comments received by November 1, 1973 will be considered. Steps previously taken by the Environmental Protection Agency to facilitate public response within this time period are outlined in the advance notice concerning public review procedures published on August 6, 1973 (38 FR 21202).

Dated October 1, 1973.

RUSSELL E. TRAIN,
Administrator.

PART 413—EFFLUENT LIMITATIONS GUIDELINES FOR EXISTING SOURCES AND STANDARDS OF PERFORMANCE AND PRETREATMENT STANDARDS FOR NEW SOURCES FOR THE ELECTROPLATING CATEGORY

Subpart A—Electroplating of Copper, Nickel, Chromium and Zinc on Ferrous, Nonferrous and Plastic Materials Subcategory

Sec.

413.10 Applicability; description of electroplating of copper, nickel, chromium and zinc on ferrous, nonferrous and plastic materials subcategory.
413.11 Special definitions.
413.12 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.
413.13 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.
413.14 Standards of performance for new sources.
413.15 Pretreatment standards for new sources.

Subpart A—Electroplating of Copper, Nickel, Chromium and Zinc on Ferrous, Nonferrous and Plastic Materials Subcategory.

§ 413.10 Applicability; description of electroplating of copper, nickel, chromium and zinc on ferrous, nonferrous and plastic materials subcategory

The provisions of this subpart are applicable to discharges resulting from the process in which a ferrous, nonferrous, or plastic base material is electroplated with copper, nickel, chromium, zinc, or any combination thereof.

§ 413.11 Special definitions.

For the purposes of this Subpart A:

(a) The term "process waste water" shall mean any water which comes into contact with any ferrous, nonferrous, or plastic basis material undergoing a copper, nickel, chromium, or zinc electroplating process, and shall include, but not be limited to, waste water from preplating, rinsing, and postplating, operations.

(b) The term "process waste water pollutants" shall mean pollutants contained in process waste waters.

(c) For the purposes of this subpart, the following abbreviations shall have the following meaning: (1) mg shall mean milligram(s); (2) sq m shall mean square meters of surface plated with copper, nickel, chromium, or zinc; (3) lb shall mean pound(s); (4) sq ft shall mean square feet of surface plated with copper, nickel, chromium, or zinc; (5) Cu shall mean total copper; (6) Ni shall mean total nickel;; (7) Cr^{6+} shall mean hexavalent chromium; (8) CrT shall mean total chromium (9) CN shall mean cyanide, total or oxidizable as noted; (10) SS shall mean suspended solids; and (11) pH shall mean the negative logarithm of the hydrogen ion concentration.

§ 413.12 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

(a) The following table sets forth the effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available by a point source subject to the provisions of this subpart:

TABLE I.—EFFLUENT LIMITATIONS BASED ON BEST PRACTICABLE CONTROL TECHNOLOGY CURRENTLY AVAILABLE

Effluent characteristic	Effluent limitation	
	Maximum for any one day	
	mg./sq. m.	lb./10^3 sq. ft.
Copper (Cu)	80	16.4
Nickel (Ni)	80	16.4
Chromium, hexavalent (Cr+6)	8	1.6
Chromium, total (CrT)	80	16.4
Zinc, (Zn)	80	16.4
Cyanide, oxidizable (CN)	8	1.6
Cyanide, total (CN)	80	16.4
Suspended solids (SS)	2,400	491
pH	Within the range of 6.0 to 9.5	
	Effluent limitation	
	Maximum average of daily values for any period of 30 consecutive days	
	mg./sq. m.	lb./10^3 sq. ft.
Copper (Cu)	40	8.2
Nickel (Ni)	40	8.2
Chromium, hexavalent (Cr6+)	4	0.8
Chromium, total (CrT)	40	8.2
Zinc, (Zn)	40	8.2
Cyanide, oxidizable (CN)	4	0.8
Cyanide, total (CN)	40	8.2
Suspended Solids (SS)	1,200	246
pH	Within the range of 6.0 to 9.5	

§ 413.13 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

(a) The effluent limitation representing the degree of effluent reduction attainable by the application of the best available technology economically achievable is no discharge of process waste water pollutants.

(b) Application of the factors listed in Section 304(b) may require variation from the effluent limitation set forth in this Section for any point source subject to such effluent limitation with a production less than 120 sq m per hour. If variation is determined to be necessary for any such source, such source shall be subject to effluent limitations no less stringent than those required by the standards of performance for new sources set forth in § 413.14.

§ 413.14 Standards of performance for new sources.

(a) The following table sets forth standards of performance representing the degree of effluent reduction attainable by the application of the best available demonstrated control technology by a point source subject to the provisions of this subpart:

TABLE 2.—STANDARDS OF PERFORMANCE BASED ON THE BEST AVAILABLE DEMONSTRATED CONTROL TECHNOLOGY

Effluent Characteristic	Standard of performance	
	Maximum for an yone day	
	mg./sq. m.	*lb./10 ^{6} sq. ft.*
Copper (Cu)	40	8.2
Nickel (Ni)	40	8.2
Chromium, hexavalent (Cr +6)	4	0.8
Chromium, total (CrT)	40	8.2
Zinc, (Zn)	40	8.2
Cyanide, oxidizable (CN)	4	0.8
Cyanide, total (CN)	40	8.2
Suspended solids (SS)	1,200	246
pH	Within the range of 6.0 to 9.5	
	Standard of performance	
	Maximum average of daily values for any period of 30 consecutive days	
	mg./sq./m.	*lb./10 ^{6} sq. ft.*
Copper (Cu)	20	4.1
Nickel (Ni)	20	4.1
Chromium, hexavalent (Cr 6+)	2	0.4
Chromium, total (CrT)	20	4.1
Zinc, (Zn)	20	4.1
Cyanide, oxicizable (CN)	2	0.4
Cyanide, total (CN)	20	4.1
Suspended solids (SS)	600	123
pH	Within the range of 6.0 to 9.5	

§ 413.15 Pretreatment standards for new sources.

The pretreatment standards under section 307(c) of the Act, for a source within the electroplating of copper, nickel, chromium and zinc on ferrous, nonferrous and plastic materials subcategory which is an industrial user of a publicly owned treatment works, (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to navigable waters), shall be the standard set forth in 40 CFR, Part 128, except that for the purposes of this section 40 CFR § 128.133 shall be amended to read as follows: "In addition to the prohibitions set forth in section 128.131, the pretreatment standard for incompatible pollutants introduced into a publicly owned treatment works by a major contributing industry shall be the standard of performance for new sources specified in § 413.14, 40 CFR Part 413: *Provided That,* if the publicity owned treatment work is committed, in its NPDES permit, to remove a specified percentage of any incompatible pollutant, the pretreatment standard applicable to users of such treatment works shall be correspondingly reduced for that pollutant."

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